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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,693	08/17/2001	Koji Matsuo	KOJIM-417	1573

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MILLEN, WHITE, ZELANO & BRANIGAN, P.C.
2200 CLARENDON BLVD.
SUITE 1400
ARLINGTON, VA 22201

EXAMINER

LOPEZ, CARLOS N

ART UNIT PAPER NUMBER

1731

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/930,693

Applicant(s)

MATSUO ET AL.

Examiner

Carlos Lopez

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 4-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 7, 10-11, 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by lino et al (US 5,210,816). lino discloses a supplying oxygen, hydrogen and silicon tetrachloride reactant from a burner 8 to a reaction zone (Col. 3, lines 55ff). As shown in figure 3, the burner 8 is at a 90 degree angle to the silica matrix 10 and as shown in figure 4, the density of the silica matrix ranges from .2 to .8 g/cm³ wherein the density distribution of the silica matrix is within .1 g/cm³ between 0 and .5 of the standardized radius of the matrix. It is deemed that the silica matrix having a distribution of less than .1 g/cm³ in only half of the silica matrix reads on the claimed invention. As for the claimed step of heating and vitrifying the silica matrix, Col. 4, lines 38ff of lino discloses heating and glassification of the silica matrix in fluorine atmosphere with helium gas (See table 2).

As for claim 15, figure 3 of lino shows the silica matrix in cylindrical form.

As for claims 16 and 17, lino's method is VAD process (See Col. 3, line 58).

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 7-11, and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey et al (US 6,319,634) in view of Iino et al (US 5,210,816) and/or Deliso et al (US 6,263,706) and in further view of Otsuka et al (US 6,333,284). Berkey discloses a method of making a photomask blank by the flame hydrolysis method. As shown by Berkey in bridging paragraph of columns 5-6 and figure 8, porous silica matrix is produced by feeding oxygen gas, hydrogen gas, a silica-forming reactant gas, from a burner to a reaction zone, flame hydrolyzing the silica-forming reactant gas in the reaction zone to form fine particles of silica and depositing the silica particles on a rotatable substrate (42) in the reaction zone. The claimed angle between the burner 48 and the formed silica matrix 46 is 90 degrees as shown in figure 8. The claimed heating and vitrifying in a fluorine atmosphere is taught in column 8, lines 12-15 and Col. 7 lines 40-50.

Berkey further notes that the transmission of the glass preform tube, for which a photomask is derived, is preferably homogenous at -2% to +2% (Col. 13, lines 55ff). Since the preform is only being doped with fluorine and it is known that the concentration distribution of the fluorine will have a direct effect on the homogeneity of the photomask transmission, one of ordinary skill in the art would thus reason that the

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distribution of the fluorine concentration should be constant, zero. Applicant is also directed to examples 1 through 4 of Berkey showing a uniform concentration of fluorine.

Berkey does not disclose the density distribution of the photomask blank. However, lino et al notes that silica soot is easier to dope with fluorine when it has a low density and harder when its density is higher (See Bridging paragraph 3-4 and Col. 4, lines 34ff). As alternatively explained by Deliso et al in Col. 1, lines 35-39, the lower the silica density the higher the fluorine dopant will be. Also note Deliso teaching homogenous fluorine doping requires constant soot density (Col. 4, lines 55ff). Hence in order to achieve a homogenous transmission/fluorine concentration as sought by Berkey, the silica soot should have a constant density distribution in order to avoid having areas that affect fluorine concentration, transmission.

Thus in view that the degree of doping concentration depends on the density of silica as noted by Deliso and lino above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have density of the silica soot constant, zero, in order to achieve the desired homogenous optical transmission and a constant fluorine concentration through out the glass blank as taught by Berkey.

In regards to the claimed silica density, Otsuka teaches that the silica density for synthetic glass quartz, intended to be used for lithography photomask, have a density range of .3 to .6g/cm³ or preferably 0.4 to 0.5 g/cm³ in order to assure the complete removal of hydroxyl groups during vitrification. Hence, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have provided Berkey's silica matrix with a constant density as taught by Deliso and lino with

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a silica matrix density of .3 to .6g/cm³ as taught by Otsuka in order to assure complete removal of hydroxyl groups during vitrification.

As for claim 2, Berkey in col. 8, lines 5 ff, discloses feeding fluorine in the reaction zone along with the silica-forming reactant gas.

As for claims 7-9, Berkey teaches of using silicone tetrachloride, siloxane SiO₂, which would include the claimed tetramethylsiloxane, and silicone tetrafluoride (Col. 6, lines 15ff).

As for claims 10-11, Berkey in Col. 7 lines 40-50, discloses doping the silica matrix in a fluorine atmosphere containing helium.

As for claim 15, the silica matrix in figure 8 of Berkey has a cylindrical form.

It is noted to applicant that the while it is true that Deliso and lino are drawn to the formation of silica matrix for the production of an optical fiber, in contrast to Berkey's method for photomask production, the teachings and principles that govern the doping of a silica matrix per se, are generic that are applied to the formation of silica matrix regardless its intended purposes whether is for photomask or optical fiber production.

Claims 3 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey et al (US 6,319,634) in view of lino et al (US 5,210,816) and/or Deliso et al (US 6,263,706) and in further view of Otsuka et al (US 6,333,284) as applied to claim 1 above, and in further of Shiraishi et al (US 6,653,024). Berkey is silent treating the photomask blank quartz glass in a hydrogen-containing atmosphere. However, Shiraishi teaches in bridging paragraph of col. 18-19: "Further, the fluorine-doped synthetic

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silica glass is heat treated in a hydrogen gas-containing atmosphere to obtain fluorine- and hydrogen-doped synthetic silica glass (S5). As the hydrogen gas-containing atmosphere, an inert gas atmosphere containing 0.1 to 100vol % of hydrogen gas is preferable". As noted by Shiraishi (Bridging paragraph of col. 18-19), the doping hydrogen is done at relatively low temperature, not more than 500 degrees Celsius, in this manner hydrogen molecules can be doped in the glass in a hydrogen molecules state, H_2 , without creation of Si-H bonds with the glass, which easily become unwanted E'centers, and without causing a reduction of the Si-F bonds of the fluorine doped glass. Thus, the doped glass having hydrogen atoms terminates any E'centers produced by exposure to ultraviolet rays and a stronger UV resistance glass can be obtained (Bridging paragraph of col. 18-19). Thus, at the time the invention was made it would have been obvious to a person of ordinary skill in the art to have heat treat Berkey's glass, made by the combined teachings of Otsuka and Iino/Deliso, in a hydrogen containing atmosphere at a temperature of not more than 500 degrees Celsius, in order to obtain a stronger UV resistant glass.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 7-15 on 7/16/04 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Lopez whose telephone number is 571.272.1193. The examiner can normally be reached on Mon.-Fri. 8am - 5pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571.272.1189. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CL
October 4, 2004


STEVEN P. GRIFFIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700